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SOME NOTES ON THE USE OF THE ELECTRIC LIGHT IN MEDICINE.

C.

By JOHN MACINTYRE, M.B.,

Surgeon for Diseases of the Throat, Anderson College Dispensary; Demonstrator
of Anatomy, Glasgow Royal Infirmary School of Medicine.

HAVING made experiments lately on the illumination of cavities by the Electric Light, it may interest the readers of this *Journal* to hear something of methods of examination which are daily coming more within the reach of the profession. Some observers, who have become accustomed to the usual gas or oil flame and reflectors, may be inclined to content themselves with these, which, for ordinary purposes, are doubtless very satisfactory. On the other hand, many whose work necessitates the frequent examination of mucous membranes would prefer to use a clearer and whiter light than can be got from oil or gas. One can easily understand this, for although one may have an efficient apparatus in the Consulting room, the practitioner is often compelled in the patient's home to use a badly placed gas bracket, lamp, or candle giving a very inferior light, unless he be in possession of a more or less complicated and often not very portable apparatus. Another

serious objection may be mentioned to our present methods of illumination, that is, the necessity in laryngeal cases for placing the patient in the upright position in order to obtain a satisfactory view of the parts. It would obviously be a great benefit could the cavity be examined with the patient lying in bed and the head resting comfortably on the pillow. All things considered it is not surprising to find that attempts should be made to furnish an apparatus which would combine efficient illumination with simple and portable arrangements.

That electricity has given us a better light most men will admit who have seen Trouvé's photophore. This fails in portability, however, not to speak of its cost. It will be noted, nevertheless, that the appliance simplifies our arrangements by dispensing with the mirror on the forehead.

Being convinced that a less powerful light, if more directly and thereby more economically applied, would illuminate the cavities sufficiently, Mr. White, optician, was instructed to make some apparatus with a view to this. The first thing to be obtained was the lamp, and it was selected with regard to its size; secondly, sufficient power of illumination; and, lastly, so easily driven that for portability a small battery could work it. This was soon placed at my disposal, and instructions were given to fit it up as seen in Fig. 1. The lamp is drawn natural size. A is a small platinum cup, serving the

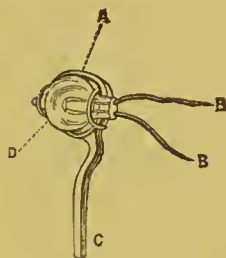


FIG. 1.

double purpose of a reflector anteriorly, and posteriorly a shade to protect the eye of the observer from the glare; B, B, are the wires to the battery; C, the stem; D, the lamp itself.

For the battery required it may be stated that after many experiments I determined to adopt the common Bichromate cell as being the most suitable. For the Consulting room three No. 3 Leclanché cells do very well, and they can be used for charging secondary batteries. However, it may be said that so little power is required to work such a lamp that a suitable battery might be arranged in many portable forms. The one made for me consists of two cells placed in a box measuring $7 \times 7 \times 4$ inches, which also holds a small resistance coil to regulate the force of the current and leaves room for various specula.

The first instrument to which the lamp was fitted was Schnitzler's nasal speculum. See Fig. 2. A represents the

lamp in position; v, the non-conducting receiver for it; B, wire to battery; the circuit being completed by touching any part of the metal speculum.

Having succeeded with this, the lamp was next attached to the ear speculum, as seen in Fig. 3. A, the lamp; B, B, the wires; v, the terminal. The lamp was also fitted to the vaginal speculum, as seen in Fig. 4. A, the lamp; B, B, wires to battery; w, means of placing it on the speculum. This can be readily applied to any set.

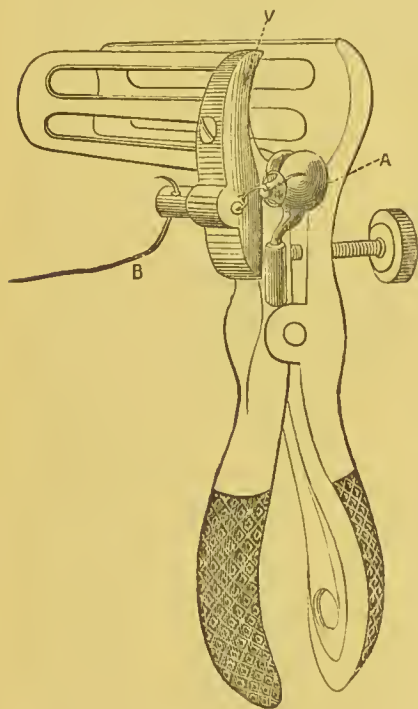


FIG. 2.

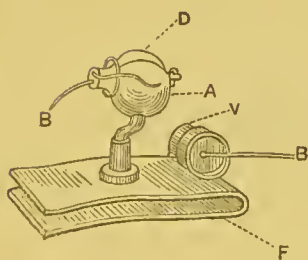


FIG. 5.

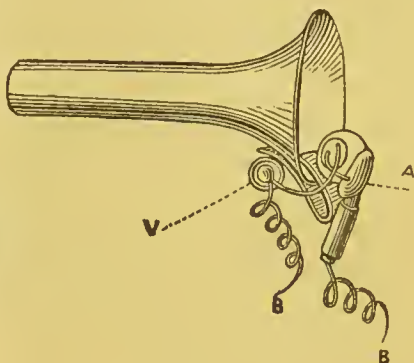


FIG. 3.

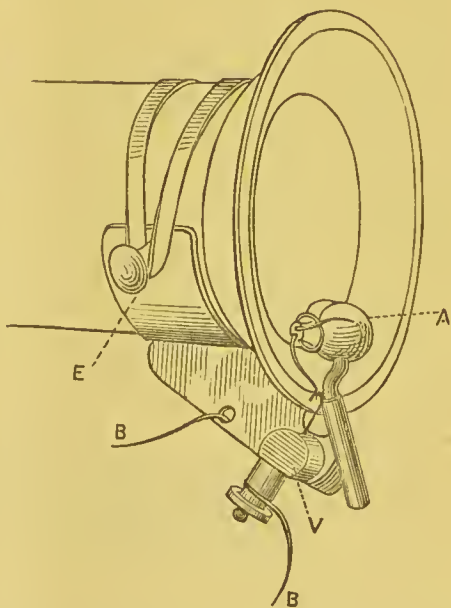


FIG. 4.

Fig. 5 represents a clip which can be applied to any tongue depressor, and to either side of the instrument. A, the cover

of lamp; B, wire; D, lamp; F, the elip. It will be seen that the lamp can be turned in any direction, and is very convenient for lighting up the mouth and posterior wall of the pharynx.

Having had a number of cases where an illumination of the nasal cavity from behind was thought desirable, instructions were given to make an apparatus which could be passed

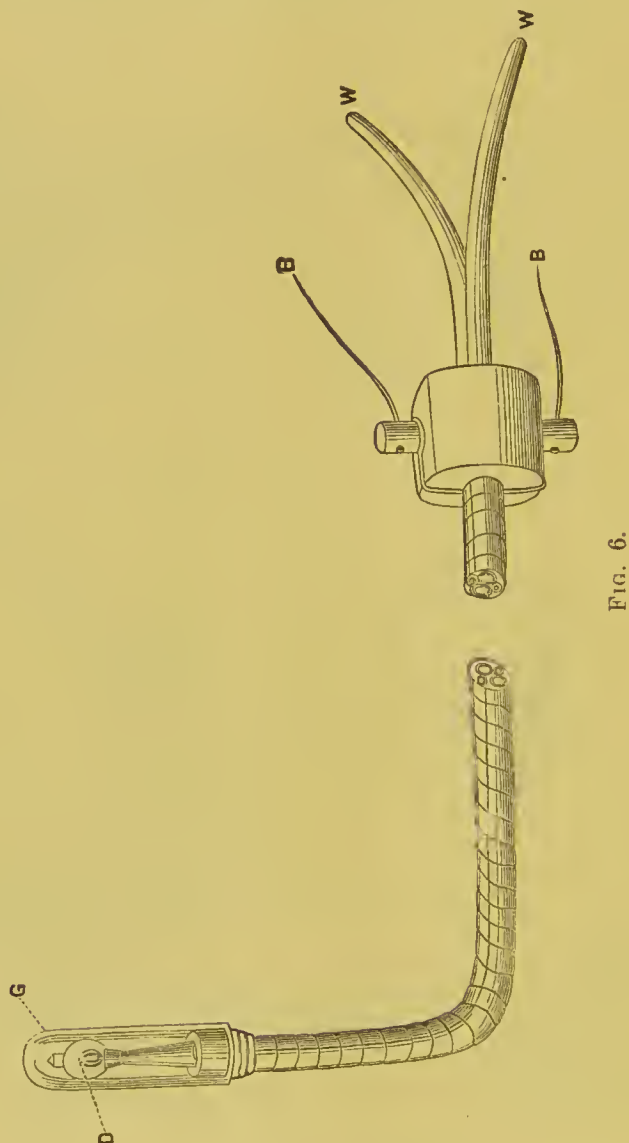


FIG. 6.

to the posterior nares. Here a difficulty was experienced in the heating of the lamp, and consequently it could not be retained any length of time in this position. This was overcome by

sending a stream of water over the surface of the lamp, as shown in Fig. 6. D is the lamp; G, a glass cover; W,W, are two tubes leading to the inside of G; B,B, the wires to the battery. By attaching small elastic tubing to W,W, a current of water can be passed over D, the lamp.

In all the above instruments the light falls directly on the object itself, but to see the larynx, of course, necessitates the introduction of a reflecting surface to the back of the mouth ere the organ can be lit up, and an image seen. This throws a difficulty in the way, but it can be overcome. The first attempt to illuminate the larynx by the electric light which was brought under my notice was one figured in Leiter's *Catalogue* for 1883.

The apparatus described in Fig. 7 is got up on this principle. A is the cup and lamp; G, a cover to protect the soft parts as the lamp warms. The lamp can be placed on the back or a lower border—anywhere in fact.

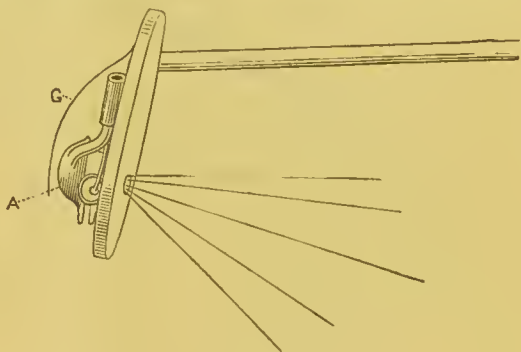


FIG. 7.

Several objections can be urged against this arrangement, however. Firstly, the lamp becomes warm, and the metal rim heats very rapidly. Doubtless this could be overcome by a similar arrangement to that described in Fig. 6; in fact, Mr. White was instructed to do so, but the idea was abandoned, as it complicated the apparatus very much. Secondly, to bore a hole, or in any way to allow the light to pass through the mirror interferes with the image of the larynx. Thirdly, the antero-posterior diameter is increased considerably, an awkward thing in many morbid conditions. Fourthly, it necessitates the filling up of each mirror; and, lastly, it is not easily kept clean. For these and other reasons the above was rejected, and after many experiments a totally different principle was tried.* The lamp was placed in the front of the mirror as seen in Fig. 8. V is a non-conducting bracket which slides on the stem of the laryngeal mirror, so that the lamp can be placed anywhere between it and the handle. By

* The above instruments were shown at the Glasgow Medico-Chirurgical Society on 7th Nov., 1884, and since then Messrs. Hilliard & Son, who kindly placed the whole of their electric apparatus at my disposal, tell me that a M. Laverne of Paris is exhibiting a lamp similar to this.

doing so, we get a good view of the larynx, heating is greatly done away with, and it can be attached to *any* set of laryngeal mirrors; and these, of course, can be kept as clean as those in daily use. This method has its objections; amongst others, it may be mentioned that, to a small extent, the lamp is in the way of instruments when operating.

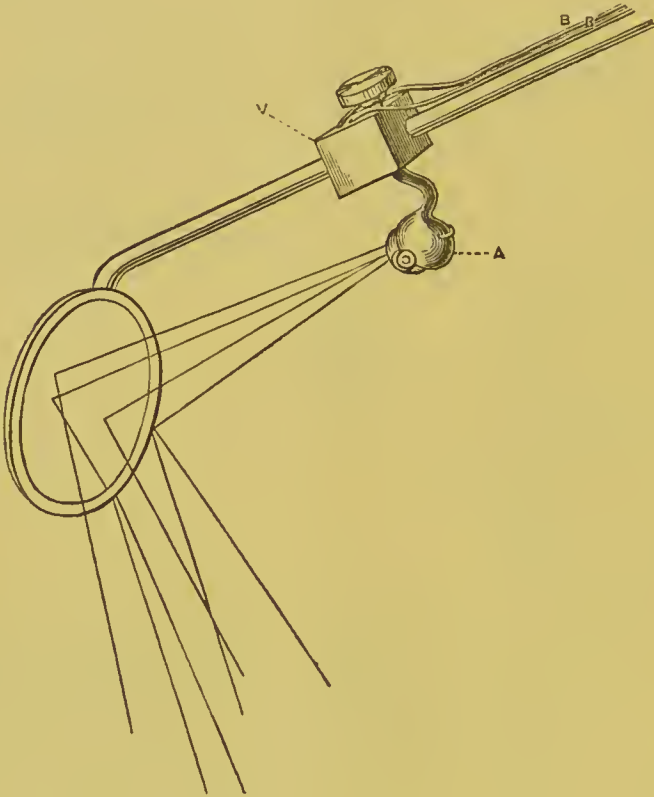


FIG. 8.

It will be noted that, could we place the lamp entirely outside the mouth, on the handle of the mirror, the inconvenience of heating would be at once overcome, and would no longer be in the way of instruments. By doing this, however, a loss of light is experienced, and so it is better to use a more powerful lamp, which, of course, means a larger battery; and this last method may, therefore, be better suited for the consulting room. When this is done we require to twist the mirror slightly on the stem, because, as at present placed, it is necessary to depress the handle to get the proper angle of 45° to the horizon, and without this the teeth would interfere with the light. Fig. 9 shows this instrument.

D, the lamp; A, the cover; B,B, wires to battery; K, band for binding it at the handle; J, joint for altering the position of the lamp, D. This arrangement, when the mirror is removed, is an excellent one for illuminating the pharynx or mouth.

What, then, are the advantages to be derived from such apparatus? That a light well suited for the examination of mucous membrane can be got is evident. Secondly, the reflectors can be dispensed with. Thirdly, the patient can be more comfortably examined, and this at his own house. On the other hand, there are, of course, disadvantages. At present most electric lights are somewhat expensive, but the above battery and lamp can be got for little more than the price of our common laryngoscope. Again, the light must be used for a time before one becomes accustomed to the appearance of morbid conditions as seen by it. The greatest difficulty lies in the battery itself, which is always troublesome. Of late, so many improvements have been made in secondary batteries, that strong hopes may be entertained that this will speedily be overcome. If it be the case, as the inventors, Messrs. Woodhouse & Rawson, London, and M. Laverne, Paris, state, that thoroughly reliable accumulators are in the market, the whole difficulty will disappear. They have yet to be tested, but from what I have seen of them they bid fair to become an invaluable aid, and are a striking proof of the advancements which are daily being made in this department of science.

At a future time something about the results of clinical

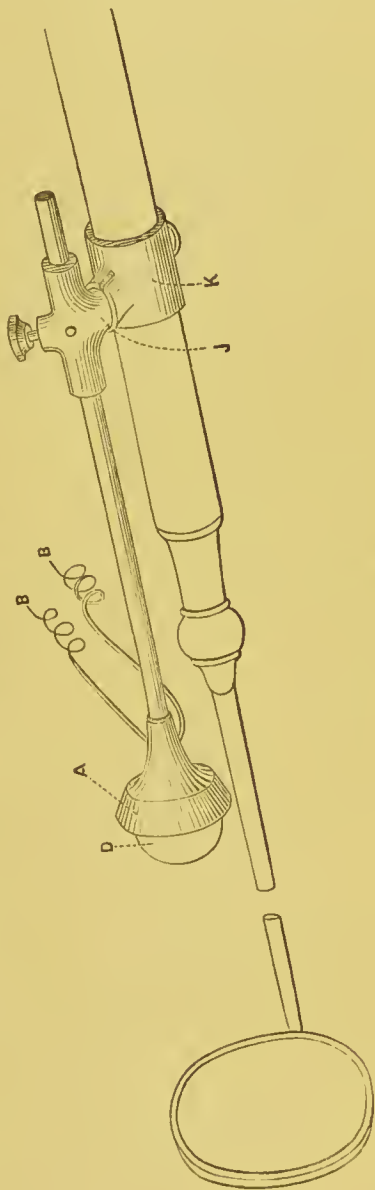


FIG. 8.

examination with these instruments may be placed before the readers of this *Journal*. The above apparatus must necessarily be deficient in many details, which will be added as may be found advisable. Meantime, let it be said that although we are as yet in the region of experiment, as we become more familiar with the electric light, it is certain to be extensively employed in medicine.

